

Four advanced detectors built by international collaborations of scientists will study the details of RHIC collisions.

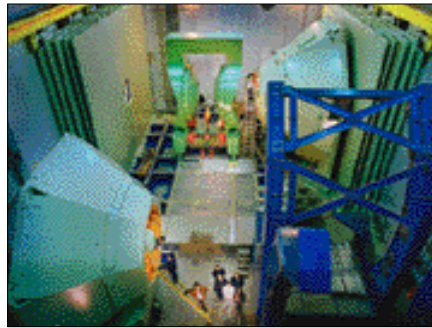
To study RHIC collisions, physicists have built four primary experiments. More may be built later. All use sophisticated technology and powerful computers to help the scientists explore the subatomic world.

STAR

- STAR specializes in tracking the thousands of electrically charged particles produced by each RHIC collision. As big as a house, STAR searches for signs of the form of matter that RHIC aims to create: the quark-gluon plasma.
- STAR's "heart" is the Time Projection Chamber, made of many electronic systems to track and identify particles. As each collision occurs, STAR measures many parameters simultaneously, reconstructing millions of bits of information from each recorded collision.
- The goal of STAR is to obtain a fundamental understanding of the microscopic structure of interactions between particles called hadrons, which are made of quarks and gluons.
- The STAR team is composed of over 400 scientists and engineers from 33 institutions in seven countries.

PHENIX

- The PHENIX detector looks for many different particles emerging from RHIC collisions, including photons, electrons, muons and quark-containing particles called hadrons. To do so, it uses large steel magnets that surround the area where RHIC collisions take place.
- Photons, electrons and muons are not affected by the strong force, which binds quarks and gluons together into hadrons. Because these particles can emerge from the interior of a RHIC collision unchanged, they can carry information about processes or actions within the collision. For example, escaping photons



The PHENIX detector at RHIC

can reveal information about the collision temperature.

- Physically, at 3,000 tons, PHENIX is larger than STAR. Philosophically, however, it is geared to detect far fewer and far lighter particles in each collision. Where STAR tracks

thousands, PHENIX will track hundreds.

- PHENIX has over 450 collaborators from 45 institutions in 10 countries.

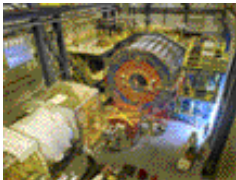
PHOBOS

- PHOBOS, one of RHIC's two smaller experiments, is based on the premise that interesting collisions will be rare. Thus, the PHOBOS detector is designed to examine a very large number of collisions and to develop a broad view of the overall consequences, along with detailed information about a small subset of the fragments ejected from the plasma. This technique permits researchers to detect rare and unusual events quickly and to study in detail about one percent of the produced particles.

- Seventy scientists from 12 institutions in three nations are working on PHOBOS.

BRAHMS

- The other small detector is the BRAHMS experiment. This device will study charged hadrons as they pass through detectors called spectrometers.
- BRAHMS differs from PHOBOS in that it will measure only a small number of particles emerging from a specific set of angles during each collision. The momentum, energy and other characteristics of the particles are measured very precisely.
- BRAHMS has 51 participants from 14 institutions in eight countries.



The STAR detector at RHIC